217/785-1705

CONSTRUCTION PERMIT -- NSPS SOURCE

PERMITTEE

University of Illinois at Chicago
Attn: Heather Jackson, Assistant Director of Chemical Safety and Environmental Compliance
1129 South Hermitage (MC 645)
Chicago, Illinois 60612

Application No.: 13080001 I.D. No.: 031600CRS
Applicant's Designation: Date Received: August 2, 2013
Construction of: New Natural Gas Fired Boiler (Boiler #7)
Date Issued: March 10, 2014
Location: UIC-West Campus, 1717 West Taylor Street, Chicago, Cook County, 60612

This Permit is hereby granted to the above-designated Permittee to CONSTRUCT emissions source(s) and/or air pollution control equipment consisting of a natural gas-fired boiler, as described in the above referenced application. This Permit is subject to standard conditions attached hereto and the following special condition(s):

1. Introduction

The project involves installation of a natural gas-fired boiler, Boiler #7 (the affected boiler) at the West Campus. The boiler will fire natural gas as its primary fuel and distillate oil for backup. The new boiler is planned as a replacement for an existing natural gas fired boiler (existing Boiler #7) that is near the end of its useful life.

2-1. Applicable Federal Emission Standards

a. The affected boiler is subject to the federal New Source Performance Standards (NSPS) for Industrial-Commercial-Institutional Steam Generating Units, 40 CFR 60 Subpart Db (Boiler NSPS), and related requirements of the General Provisions of the NSPS, 40 CFR 60 Subpart A.

b. i. Pursuant to the NSPS, 40 CFR 60.44b(i) and (l)(1), as a high heat release rate boiler, the nitrogen oxide (NOx) emissions of the affected boiler shall not exceed 86 ng/J (0.20 lb/million Btu) heat input on a 30-day rolling average basis, beginning on and after the date on which the initial performance test is completed or is required to be completed under 40 CFR 60.8, whichever date comes first.

Note: NOx emissions of the boiler are subject to more stringent limits pursuant to Condition 5(a).

ii. As provided by 40 CFR 60.46b(e)(4), unless alternative monitoring is approved by USEPA pursuant to 40 CFR 60.13(i), during periods when performance tests are not being conducted, NOx emissions

data collected by monitoring pursuant to 40 CFR 60.48b(g)(1) or (g)(2) shall be used to calculate a 30-day rolling average emission rate on a daily basis and used to prepare excess emission reports, but not used to determine compliance with this NOx emission standard. A new 30-day rolling average emission rate must be calculated each boiler operating day as the average of all of the hourly NOx emission data for the preceding 30 boiler operating days.

c. Pursuant to 40 CFR 60.43b(f) and (g), at all times while firing distillate oil except during periods of startup, shutdown or malfunction, the emissions of smoke or other particulate matter from the affected boiler shall not have an opacity greater than 20 percent (6-minute average), except for one 6-minute period per hour of not more than 27 percent opacity.

2-2. Applicable State Emission Standards

a. Pursuant to 35 IAC 212.123(a), the emissions of smoke or other particulate matter from the affected boiler shall not have an opacity greater than 30 percent, except as provided in 35 IAC 212.123(b).

b. When the affected boiler is fired on distillate oil, it is subject to 35 IAC 212.206, which provides that the emissions of particulate matter (PM) from the boiler due to firing of oil shall not exceed 0.15 kg of PM per MW-hour of actual heat input (0.10 lb/mmBtu).

c. When the affected boiler is fired on distillate oil, it is subject to 35 IAC 214.122(b)(2), which provides that the emissions of sulfur dioxide (SO_2) from the boiler due to firing of oil shall not exceed 0.46 kg of SO_2 per MW-hour of actual heat input (0.3 lb/mmBtu).

Note: This emission standard requires the sulfur content of the oil fired in the boiler to not exceed 0.15 lb/mmBtu.

d. Pursuant to 35 IAC 216.121, the emissions of carbon monoxide (CO) from the affected boiler shall not exceed 200 ppm, corrected to 50 percent excess air.

e. Effective January 1, 2015, pursuant to 35 IAC 217.152(a), the affected boiler will become subject to the control requirements of 35 IAC 217 Subparts D and E, which establish requirements that reflect Reasonably Available Control Technology for boilers related to emissions of NOx.

Note: The limit in 35 IAC Part 217 Subpart E, which applies on an ozone season and an annual basis, is less stringent than the emission limits for NOx set for the affected boiler in Condition 5.

3. Non-Applicability Provisions

a. This permit is issued based on this project not being a major project for purposes of state rules for Major Stationary Sources Construction and Modification (MSSCAM), 35 IAC Part 203, and the federal rules for Prevention of Significant Deterioration of Air Quality (PSD),40 CFR 52.21, because the emissions of various pollutants will not be significant. In particular, the permitted emissions of the affected boiler are less than 40 tons/year for NOx, 100 tons/year for CO and 75,000 tons/year for greenhouse gases (GHG), as carbon dioxide equivalents (CO_2e).

b. This permit is issued based on the affected boiler not being subject to the SO_2 emission standards and SO_2 continuous emissions monitoring system requirements of the NSPS, 40 CFR 60.42b and 60.47b(a). This is because very low sulfur oil (as defined in 40 CFR 60.41b) and gaseous fuel is being fired in the boiler so these requirements do not apply pursuant to 40 CFR 60.42b(k)(2) and 60.47b(f).

c. This permit is issued based on the affected boiler not being subject to the PM emission standard of the NSPS, 40 CFR 60.43b(h)(1). This is because the fuel oil combusted in the boiler will contain less than 0.3 percent sulfur by weight so this standard does not apply pursuant to 40 CFR 60.43b(h)(5).

d. This permit is issued based on the affected boiler not being subject to the federal National Emission Standards for Hazardous Air Pollutants (NESHAP) for Industrial, Commercial, and Institutional Boilers at Area Sources, 40 CFR 63, Subpart JJJJJJ. This is because the affected boiler meets definition of a gas fired boiler at 40 CFR 63.11237 and, pursuant to 40 CFR 63.11195(e), gas fired boilers are not subject to the requirements of this NESHAP.

e. This permit is issued based on the affected boiler not being subject to the requirements of 35 IAC 217 Subpart U, pursuant to 35 IAC 217.454(a). This is because maximum design heat input of the boiler is less than 250 mmBtu/hour.

4. Operational Limits

a. i. Natural gas and distillate fuel oil shall be the only fuels fired in the affected boiler.

ii. The affected boiler shall be operated so as to qualify as a “gas fired boiler” as defined in 40 CFR 63.11237. That is, the boiler shall only burn gaseous fuels not combined with any solid fuels and burn liquid fuel only during periods of gas curtailment, gas supply interruption, startups, or periodic testing on liquid fuel. Periodic testing of liquid

fuel shall not exceed a combined total of 48 hours during any calendar year.

b. The design heat input of the affected boiler shall not exceed 220 mmBtu/hour.

c. i. The consumption of natural gas by the affected boiler shall not exceed 160.5 million scf per month and 1,097.5 million scf per year.

ii. The usage of distillate fuel oil by the affected boiler shall not exceed 730,000 gallons per year.

iii. Compliance with these annual limits and other annual limits set by this permit, unless otherwise specified in a particular condition, shall be determined from a running total of 12 months of data, i.e., from the sum of the data for the current month plus the preceding 11 months (running 12 month total).

5. Emissions

a. i. The emissions of the affected boiler shall not exceed the following limits:

Pollutant	Emission Limits			
	Lb/mmBtu[3, 4]			
	Gas	Oil	Tons/Month	Tons/Year
NOx	0.061		5.4	37.2
CO	0.150	0.155	12.5	91.9
PM[1]	0.0019	0.030	1.6	2.6
$PM_{10}/PM_{2.5}$[2]	0.0075	0.030	1.8	5.7
VOM	0.004		0.3	2.4
GHG, as CO_2e	117	163.6	11,960	73,900

Notes:

[1] PM only includes filterable particulate as measured by USEPA Method 5 or other appropriate USEPA Test Method for PM.

[2] PM_{10} and $PM_{2.5}$ include both filterable and condensable particulate.

[3] For pollutants other than for NOx, compliance with the limits in lbs/mmBtu shall be determined on a three hour average or based on the results of stack tests (average of two or three test runs, each nominally one-hour duration). Compliance with the limit for NOx in lbs/mmBtu shall be determined on a 30-day rolling average basis, using the methodology of the NSPS, 40 CFR 60.46b(e)(4) or, if alternative

monitoring has been approved by USEPA, 40 CFR 60.13(i).

[4] These limits in lbs/mmBtu become effective after either the commissioning and initial tuning of the boiler is completed by the manufacturer or supplier of the boiler or the initial performance testing for NOx emissions required by the NSPS is conducted or should have been conducted, whichever occurs first.

ii. Notwithstanding the above, if the affected boiler fires oil during gas curtailments and/or gas supply interruptions for more than 24 hours during a 30-day rolling period, the average NOx emissions of the boiler during the gas curtailments and/or interruptions shall not exceed 0.070 lb/mmBtu and the emissions during such gas curtailments and/or interruptions shall not be considered in determining compliance with the NOx limit in Condition 5(a)(i) (i.e., 0.061 lb/mmBtu), during such 30-day period.

b. This permit is issued based on minimal emissions of SO_2 from the affected boiler. For this purpose, the SO_2 emissions of the boiler shall not exceed 1.1 tons/year.

6. Requirements for Performance Testing

a. Pursuant to 40 CFR 60.8 and 60.46b(c) and (e), for the affected boiler for emissions of NOx, the Permittee shall comply with the applicable requirements of the NSPS for performance testing using the continuous system for monitoring NO_X under 40 CFR 60.48b:

i. Pursuant to 40 CFR 60.46b(e)(1), for the initial test required by 40 CFR 60.8, NOx from the boiler shall be monitored for 30 successive boiler operating days and the 30-day average emission rate is used to determine compliance with the NOx emission standard under the NSPS, 60 CFR 60.44b. The 30-day average emission rate is calculated as the average of all hourly emissions data recorded by the monitoring system during the 30-day test period.

ii. Pursuant to 40 CFR 60.46b(e)(4), following the date on which the initial test under 40 CFR 60.8 is completed, the Permittee shall upon request from the Illinois EPA or USEPA determine compliance with the NOx standard in 40 CFR 60.44b through the use of a 30-day performance test.

b. For the purpose of this performance testing, a predictive emission monitoring system (PEMS) that has been shown by the Permittee to meet the requirements of 40 CFR 60 Subpart A and Appendix B, Performance Specification 16 is considered to be a continuous system for monitoring NOx under 40 CFR 60.48b if

either: 1) The requirements of Condition 9(d) of this permit are fulfilled; 2) The use of such PEMS is approved by the Illinois EPA in a new or revised permit pursuant to 40 CFR 60.48b(g)(2) and 60.49b(c); or 3) The use of such PEMS is approved by the USEPA pursuant to 40 CFR 60.13(i).

7. Requirements for Emission Testing

a. i. A. Within one year after beginning routine operation of the affected boiler, the Permittee shall have tests conducted for the boiler for emissions of CO, VOM, and $PM_{10}/PM_{2.5}$, as specified below, at its expense by a qualified testing service while the affected boiler is firing natural gas and operating in the maximum load range and other representative operating conditions.

B. Notwithstanding the above, testing for CO is not required if the affected boiler is equipped with instrumentation for CO that can be used to provide emission data for the boilers in pounds per hour and ppm at 50 percent excess air.

ii. In addition to the testing required above, the Permittee shall have emission testing performed for CO, VOM, PM, PM_{10}, $PM_{2.5}$ and/or NOx, as specified by the Illinois EPA in the request, within 90 days of a written request by the Illinois EPA or such later date agreed to by the Illinois EPA.

b. i. Applicable USEPA test methods and procedures shall be used for testing emissions of the affected boiler, including the following methods unless another method is approved by the Illinois EPA.

Carbon Monoxide	Method 10
Nitrogen Oxide	Method 7E
Volatile Organic Material	Method 18, 25 and/or 25A
$PM_{10}/PM_{2.5}$ (filterable)	Method 5, 5I or 201A*
Condensable Particulate	Method 202 or 5 or 5I**

* Testing may be conducted using USEPA Method 5 or 5I if the Permittee reports all PM emissions measured by this method as filterable PM_{10} and $PM_{2.5}$, in which case testing using USEPA Method 201A need not be performed.

** Testing may be conducted using USEPA Method 5 or 5I if the Permittee reports all particulate material collected in the back half of the sampling train with this method as condensable particulate, in which case using Method 202 need not be performed.

ii. If visible emissions are normally present during the operation of the affected boiler, the Permittee shall have observations of the opacity of the emissions of the boiler conducted in accordance with USEPA Method 9 during this emission testing.

c. The Permittee shall submit a test plan to the Illinois EPA at least 60 days prior to this testing.

d. The Illinois EPA shall be notified prior to these tests to enable the Illinois EPA to observe these tests. Notification for the expected date of testing shall be submitted a minimum of 30 days prior to the expected date. Notification of the actual date and expected time of testing shall be submitted a minimum of 5 working days prior to the actual date of the test. The Illinois EPA may at its discretion accept notifications with shorter advance notice provided that such notifications do not interfere with the Illinois EPA's ability to observe testing.

e. Three copies of the Final Report for these tests shall be promptly submitted to the Illinois EPA and in no case later than 60 days after the completion of the testing, and shall include as a minimum:

i. A summary of results that includes the measured emission rates, the emission rates in the terms of the applicable limits (e.g., lbs/mmBtu and ppm), and whether compliance was demonstrated with applicable limits.

ii. Description of test methods and procedures used, including description of sampling train, analysis equipment, and test schedule.

iii. Detailed description of operating conditions during the period of testing, including operating parameters of the boiler (e.g., heat input, and oxygen content in the flue gas leaving the boiler).

iv. Data and calculations, including copies of all raw data sheets and records of laboratory analyses, sample calculations, and data on equipment calibration.

v. Monitored emissions of NOx during the period of testing.

vi. Opacity data if opacity observations were conducted during the period of testing (see Condition 7(b)(ii).)

f. Copies of emission test reports shall be retained for at least five years after the date that an emission test is superseded by a more recent test.

8. Requirements for Opacity Observations

a. The Permittee shall have the opacity of the emissions from the affected boiler during representative operating conditions determined in accordance with USEPA Method 9 within 30 days of a written request from the Illinois EPA. The duration of opacity observations shall be at least 30 minutes (five 6-minute averages) unless the average opacities for the first 12 minutes of observations (two 6-minute averages) are both less than 10.0 percent.

b. The Permittee shall submit a written report for these observations within 30 days of the date of observations. This report shall include:

i. Date and time of observations.

ii. Name and employer of qualified observer.

iii. Copy of current Method 9 certification.

iv. Description of weather observation conditions during observations.

v. Description of the operating conditions of the boiler.

vi. Raw data.

vii. Opacity determinations.

viii. Conclusions.

9. Requirements for Monitoring of NOx Emissions

a. For the affected boiler, the Permittee shall conduct continuous monitoring for emissions of NOx using one of the following systems:

i. Option 1: A Continuous Emissions Monitoring System (CEMS).

ii. Option 2: A Predictive Emission Monitoring System (PEMS) as further addressed by Conditions 9(d) and (e).

iii. Option 3: A Predictive Emission Monitoring System (PEMS) that has been approved by USEPA pursuant to 40 CFR 60.13(i).

Note: This permit does not address monitoring for NOx in accordance with an operational monitoring plan that does not involve a PEMS. This is because monitoring for NOx must be conducted with either a CEMS or PEMS pursuant to 35 IAC 217.157(a)(2) and (f).

b. The Permittee shall fulfill applicable requirements of the NSPS for this continuous monitoring system, including the following unless alternative requirements are approved by USEPA pursuant to 40 CFR 60.13(i). For this purpose, pursuant to 40 CFR 60.13(b), the continuous monitoring system shall be installed and operational prior to conducting the initial performance test for NOx under 40 CFR 60.8. Verification of operational status shall, as a minimum, include completion of the manufacturer's written requirements or recommendations for installation, operation, and calibration of the monitoring devices.

i. Applicable notification requirements, including 40 CFR 60.7(a)(5), 60.8(d) and 60.49b(b.

ii. Applicable operational requirements, including 40 CFR 60.13(e) and 60.48b(c), which provides that a continuous monitoring system shall be operated during all periods of operation of an affected facility except for continuous monitoring system breakdowns and repairs. Data is to be recorded during calibration checks, and zero and span adjustment.

iii. Applicable recordkeeping requirements, including 40 CFR 60.49b(g).

iv. Applicable reporting requirements, including 40 CFR 60.7(c), (d) and/or (e) and 60.49b(h).

c. The Permittee shall also fulfill applicable requirements of 35 IAC Part 217 Subpart D for this monitoring system when these requirements become applicable, including the following:

i. Applicable notification requirements of 35 IAC 217.155.

ii. Applicable recordkeeping requirements of 35 IAC 217.156(b)(9) and (b)(10).

iii. Applicable operational requirements of 35 IAC 217.157(a)(2) or (f).

iv. Applicable reporting requirements of 35 IAC 217.156(j).

d. The Permittee may conduct continuous emissions monitoring for NOx emissions of the affected boiler with a PEMS that addresses compliance with both NSPS and permit limits for NOx emissions and that meets USEPA Performance Specification 16 (PS 16), in 40 CFR Part 60 Appendix B, (including successful completion of all the required certification testing and evaluations under PS 16, including three single load RATA tests and bias F-test, and correlation tests on the RATA data), provided that:

i. The initial performance test for the NOx emissions of the affected boiler is conducted with the PEMS; and

ii. With the report for this performance test that is submitted to the Illinois EPA, the Permittee also submits a PEMS monitoring system report demonstrating fulfillment of PS 16 and a copy of the initial PEMS Plan required by Condition 9(e)(ii).

Note: This permit addresses use of PEMS as it would be a form of operational monitoring, as provided for by applicable provisions of the NSPS, 40 CFR 60.48b(g)(2) and 60.49b(c), and use of a PEMS was proposed in the application. If the initial performance test for NOx is conducted with a CEMS, this permit does not provide for use of a PEMS.

e. When conducting NOx monitoring for the affected boiler with a PEMS, the Permittee shall:

i. Fulfill applicable requirements of PS-16 for the design and operation of a PEMS, including applicable requirements of Section 6.1 (PEMS Design), Section 6.2 (Recordkeeping), Section 8.4 (Reporting), Section 8.5 (Reevaluating Your PEMS) and Sections 9 (Quality Control).

ii. Implement the PEMS in accordance with a written PEMS plan developed and maintained by the Permittee that, at a minimum, describes the PEMS and identifies the operating parameters of the boiler that are needed to determine the NOx emissions of the boiler and verify compliance with applicable standards and emission limits for NOx. The Permittee shall notify the Illinois EPA of any significant changes to the PEMS Plan, providing a description of the change, the reason for the change and the expected effects on the PEMS.

iii. Operate and maintain continuous monitors for the steam load of the boiler and other operating parameters of the boiler as specified in the PEMS Plan. These parametric monitoring systems shall be operated during all periods of operation of the boiler except for monitoring system breakdowns and repairs, consistent with 40 CFR 60.48b(c).

iv. Fulfill applicable recordkeeping and reporting requirements of the NSPS, 35 IAC Part 217 Subpart D and this permit for NOx emissions using NOx emission data generated by the PEMS.

v. Report deviations from the PEMS Plan and the above requirements to the Illinois EPA as deviations from monitoring or permit requirements.

10. Operational Monitoring Requirements

a. For the affected boiler, the Permittee shall install, operate, and maintain monitor(s) to measure and record fuel consumption.

11. Recordkeeping Requirements

a. For the affected boiler, the Permittee shall comply with the applicable recordkeeping requirements of the NSPS, including 40 CFR 60.7(b) and (f) and 60.49b(d) and (g).

b. The Permittee shall maintain a file or other records containing the following information for the affected boiler:

i. The manufacturer's specifications for the boiler including emissions guarantees and rated heat input capacity (mmBtu/hour).

ii. The operating and maintenance procedures for the boiler recommended by the manufacturer.

c. The Permittee shall keep the following operating records for the affected boiler:

i. Daily records of fuel usage and monthly records of annual capacity factor, as required by 40 CFR 60.49b(d).

ii. Records for the usage of fuel oil by the affected boiler (gallons/calendar year, by type of oil).

iii. Date, time, and duration of any period when a fuel other than natural gas was fired in the boiler, with the identity and amount of such fuel that was fired and the reason such fuel was fired, e.g., gas curtailment, gas supply interruption, or periodic testing.

iv. The total duration of periodic testing while firing a fuel other than natural gas (hours per calendar year).

v. An inspection, maintenance and repair log, including date and nature of activity.

d. For the affected boiler, the Permittee shall comply with the applicable recordkeeping requirements of 35 IAC 217.156, including 35 IAC 217.156(a) and (b).

e. The Permittee shall maintain the following records related to the emissions of the affected boiler:

i. A file containing a demonstration that the emissions of the boiler when operating normally will comply with the

applicable emission limits in lb/mmBtu in Condition 5(a)(i) for pollutants other than NOx, with supporting documentation, which information shall be kept current.

ii. Records of the NOx emissions of the boiler and other related information as required to verify compliance with the alternative emission limits for NOx in Condition 5(a)(ii).

iii. Records of the boiler's emissions of NOx, CO, PM, PM_{10}, $PM_{2.5}$, VOM and GHG, as CO_2e (tons/month and tons/year), with supporting calculations.

f. If a backup fuel other than ultra-low sulfur distillate oil is used for the affected boiler, the Permittee shall maintain the following records related to the use of backup:

i. The sulfur content of the backup fuel(s) (pounds/mmBtu), with supporting documentation.

ii. The actual SO_2 emissions of the affected boiler from firing backup fuel (tons/month and tons/year), with supporting calculations.

g. The Permittee shall keep records for all opacity measurements made in accordance with USEPA Method 9 for the affected boiler that it conducts or that are conducted at its behest. For each occasion on which such measurements are made, these records shall include the formal report for the measurements if conducted pursuant to Condition 6(c) or otherwise the identity of the observer, a description of the measurements that were made, the operating condition of the boiler, the observed opacity, and copies of the raw data sheets for the measurements.

h. Unless otherwise specified, all records required by this permit shall be retained at a readily accessible location at the source for at least five years from the date the record was generated or the date of entry. Records shall be made available for inspection and copying by the Illinois EPA or USEPA upon request. Any records retained in an electronic format (e.g., computer) shall be capable of being retrieved and printed on paper during normal source office hours so as to be able to respond to an Illinois EPA or USEPA request for records during the course of a source inspection.

12. Reporting Requirements

a. For the affected boiler, the Permittee shall comply with the applicable notification and reporting requirements of the NSPS, including 40 CFR 60.7(a), (c), (d) and (e) and 60.49b(b).

b. For the affected boiler, the Permittee shall comply with the applicable reporting requirements of 35 IAC Part 217, including 35 IAC 217.155, 217.156(g) and (j), as applicable.

c. If there is any deviation from the requirements of this permit, not otherwise addressed pursuant to the above reporting requirements, the Permittee shall submit a report to the Illinois EPA within 30 days after deviation. The report shall include a description of the deviation, the probable cause of the deviations, the corrective actions that were taken and any actions taken to reduce future occurrences.

d. Unless otherwise specified, two copies of all reports and notifications required by this permit shall be sent to the Illinois EPA, Division of Air Pollution Control, Compliance Section, in Springfield and one copy shall be sent to the Illinois EPA, Air Regional Office in Des Plaines.

13. Authorization for Operation

a. Under this permit, the affected boiler may be operated for a period of one year from initial startup to allow for equipment shakedown and emissions testing as required. This period may be extended by the Illinois EPA upon request of the Permittee if additional time is needed to complete shakedown or perform emission testing.

b. Upon completion of the initial performance test for NOx required by Condition 6(a), the Permittee may continue to operate the affected boiler until a new or revised CAAPP permit is issued that addresses the boiler, provided that a timely and complete application for such CAAPP permit is submitted in accordance with Section 39.5(5) of the Environmental Protection Act.

c. This condition supersedes Standard Condition 6.

If you have any questions on this permit, please call Christopher Romaine at 217/785-1705.

Raymond E. Pilapil Date Signed: _____
Acting Manager, Permit Section
Division of Air Pollution Control

RWB:CPR:psj

cc: FOS - Region 1, Illinois EPA
CAAPP Application File - 96080077, Illinois EPA
Lotus Notes